Details on Constructing a Ramp

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| Ramps: Made out of 3/8 inch aluminum channel bent around a round form (e.g., 2.5 lbs weight from a barbell) to get smooth transitions. Once the ramp with just one dip was bent, the second ramp was bent taking care to make the second ramp have exactly the same bend, but with an added additional dip and rise such that the total vertical height in Ramp 2 is twice that of Ramp 1. The two stands were constructed from 2 pieces of wood, but two equal size blocks of wood are just as good or PVC might also be used to make the stands. These ramps might also be constructed from wood using a template and router. Arbor Scientific has a set that can be purchased (<http://www.arborsci.com/racing-marbles-lab>) if funding is available  Optional photogates: If teachers want students to test the predictions they make in their models, it is recommended that measurements be taken at the beginning and end of each dip and at several places along flat sections using a photogate to measure the speed/velocity of the marbles. It is necessary to move the sensor to a new location and re-launch the ball for each interval, but it will detect how the speed/velocity is changing. For teachers that do not have photogates, it suggested they use stopwatches with longer ramps to minimize error. Alternatively, students could measure how ramp length and steepness affect speed and then generalize their results to the ramps used in this activity. In fact, the authors have used bowling balls and wheelchair ramps found around his school for exactly this purpose. |